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AUTHOR Rowland, Paul
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ABSTRACT

The New Mexico Solar Energy Institute (NMSEI) education program has attempted to influence teachers to increase the quantity and quality of teaching about renewable energy sources and their uses. Since 1982, the program has used the following methods for influencing energy education: a newsletter for educators; conference and classroom presentations for children, their teachers, and preteachers; development and distribution of a curriculum package for an adult education course; distribution of instructional materials; participation in a national energy education day project; and the donation of laboratory equipment. Each of these program activities is described. Also described is the evaluation of several program components, including: (1) the newsletter (asking how many people read each copy, which sections of the newsletter are most useful, and if teachers use its suggested activities in the classroom), with results based on 207 responses out of 1,000 included with the fourth issue of the first column of the newsletter; and (2) the curriculum package with content related to a solar home, based on 39 surveys (86 were mailed) returned by students who completed the course. Overall, these and the other program activities have been successful in increasing teaching about renewable energy. (JN)

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Influencing Teaching:

An Inside View of an Outside Interest Group

Paul Rowland

Education Specialist

New Mexico Solar Energy Institute

Box 3SOL, Las Cruces, NM 88003-0122

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Influencing Teaching: An Inside View of an Outside Interest Group

Paul Rowland, New Mexico Solar Energy Institute

Introduction

Special interest groups are a significant force in determining what happens in schools and colleges. Some groups exert their influence politically by lobbying state governments and school boards. These groups are seeking to change the rules, laws, and requirements that describe and constrain the activities of the school. Other special interest groups seek to influence the behavior of teachers and administrators. These groups exert influence by providing teachers with materials and services that reflect the group's point-of-view.

Although all special interest groups compete with one another to gain access to teaching time, the more similar the subject area of the interest groups, the greater the intensity of competition. In the area of energy education, special interest groups include the energy company associations such as the American Petroleum Institute, American Gas Association, Edison Electric Institute, Atomic Industrial Forum, and the National Coal Association. These national organizations are best known for the development and distribution of instructional materials about the industry they represent. Utility companies provide materials to schools but they also provide in-class presentations and one New Mexico utility provides a newsletter to educators.

The New Mexico Solar Energy Institute (NMSEI) education program (1) has attempted to influence teachers to increase the quantity and quality of teaching about renewable energy sources and their uses. Since 1982, the

program has used the following methods for influencing energy education: a newsletter for educators; conference and classroom presentations for children, their teachers, and preteachers; development and distribution of a curriculum package for an adult education course; distribution of instructional materials; participation in National Energy Education Day project; and the donation of laboratory equipment.

Newsletter

Beginning in the fall of 1984, NMSEI began publication and distribution of a newsletter for teachers, the Solar Energy Educator. (Later the name was changed to the Energy Educator.) The format of the newsletter was a four page tabloid 11 inches by 17 inches. This format was selected because it allowed the placement of two activities on a page so they could be copied onto letter size paper. The first page gives the reader basic information about the theme of the issue. (Themes of the first volume were: solar energy in New Mexico, passive solar heating, solar water heaters, and solar electricity.) The second page includes two activities in renewable energy for the elementary school child and notes about the activities for the teacher. The third page does likewise for the secondary level. The fourth page is entitled "Access to Resources" and includes reviews of books, curriculum materials, audiovisuals, and microcomputer software. The page also includes a list of services and materials available from NMSEI.

The newsletter is mailed to all New Mexico principals, science department heads, and educators who have requested their own copies. About 600 copies are sent to the teacher training institutions in New Mexico. At least two thousand copies of each of the newsletters have been distributed.

Survey Method

A postcard survey was included in the fourth issue of the first volume of the newsletter. The purpose of the survey was to determine if the newsletter was a useful tool for communicating with the school population of New Mexico. Questions centered on: how many people read each copy; do they use the activities in the classroom; and which parts of the newsletter are most useful. One thousand surveys were distributed to the principals, science department heads, and teachers who had requested their own copies. Two hundred-seven surveys were returned. No followup was attempted to increase the number of returns. This rate of return is similar to that of other energy education surveys (2) and although it is too low to allow generalization, it does allow one to characterize a portion of the readership.

Survey Results

The number of people reading a copy of the newsletter ranged from 1 to 140 with an average of 7.7 readers per copy. Eighty-eight percent (88%) of the respondents indicated that the activities in the newsletter were used in their school. The "yes" response originated in at least 55 different school districts representing 63% of the school districts in New Mexico. Respondents indicated they used the various parts of the newsletter as follows:

Page 1 Solar Energy Information	80%
Page 2 Elementary School Activities	60%
Page 3 Secondary School Activities	45%
Page 4 Access to Resources	57%

Discussion

The newsletter provides an effective way of influencing what happens in the classroom. The high level of use of activities and the multiple readership of each copy support this conclusion. New Mexico's geographically dispersed population presents special problems to the distribution of materials. The newsletter not only serves to distribute information and activities to teachers throughout the state, but it also provides them with information about what else is available from NMSEI.

Adult Education Curriculum Development

During 1983, the education project developed a curriculum package for an adult education course called the Self Sufficient Solar Home. The package was developed with a strong emphasis on the use of audiovisuals (primarily slides) and handouts. Course content included solar thermal technologies, wind energy, photovoltaics, water conservation, gardening, and earth materials construction. The course was piloted at NMSU Non-traditional Programs in Fall 1983. During spring 1984, the course was offered for one continuing education unit at University of New Mexico - Gallup and San Juan Community College, as well as New Mexico State University. Subsequently it has been offered at University of New Mexico Community College, Western New Mexico University, and New Mexico State University - Grants. Nearly 300 students have taken the course.

Survey Method

A survey was conducted of students who had taken the course before December 1984. The purpose of the survey was to determine how the course influenced the behavior of the students and if they thought the course was worthwhile. Eighty-six surveys were mailed with return, postpaid envelopes. Thirty-nine or 45 percent of the surveys were returned.

Survey Results

Twenty-seven or 69 percent had used information from the course in their home or business. Twenty-two or 56 percent had spent money on projects as a result of the course. The total amount spent was $143,116. Projects included adding insulation, caulking and weatherstripping, sunspace addition, passive solar house, solar water heater, water conservation devices, water conserving landscapes, and solar swimming pool heater. Twenty-nine indicated that they will spend money on future projects. Only three (or 8%) indicated that they had not and did not plan to spend money on projects as a result of the course. The most useful parts of the course were energy conservation and passive solar housing. Least useful were wind energy, earth construction and photovoltaics. All respondents thought the course was worthwhile.

Discussion

Institutions with adult education non-credit offerings have been receptive to offering the course. Two colleges have purchased the materials while the other colleges receive the materials on loan. The most successful courses are those offered by well established continuing education programs. High enrollments were followed by rapid declines at two sites. This may indicate that the student market can be rapidly exhausted in some areas. The effort to develop and distribute non-credit curriculum must be looked at as a successful way to distribute information to the adult population.

Conference Presentations

During the 1984-85 fiscal year, presentations were made at the state conferences of home economics teachers and science and mathematics teachers. In addition, presentations were made at the regional conference of the

National Science Teachers Association. Attendance at the workshops ranged from 21 to 40. The presentations included information about solar technologies and teaching methods and materials. Evaluations of the presentations at the regional science teachers convention indicated that 96 percent of the teachers felt they had learned something that would be useful to them in their classroom. Conference presentations allow NMSEI to contact many interested teachers from throughout the state while minimizing travel costs. Teachers at conventions tend to be those most likely to change their curriculum. These activities provide an excellent opportunity for NMSEI to provide materials and other services to teachers to influence what they teach.

Classroom Presentations

Presentations were made in classrooms from kindergarten through post secondary vocational classes. These presentation were 20 to 60 minutes long and stressed the uses of solar energy. The presentations used discussion and demonstration techniques at the elementary and midschool level and audiovisuals at the secondary and post secondary level. The presentations reached more than 5500 students and 194 teachers.

The value of short presentations in a crowded school day is questionable. Nonetheless, in at least one school the presentations were followed by an increase in the number of science projects dealing with solar energy. The presentations are most valuable when they influence the teacher to do similar activities with their students. To this end a packet of teaching activities is left with the teacher. We have not yet assessed whether the materials have been used but teacher evaluations indicated that nearly all teachers thought the materials would be useful.

In addition, presentations were made to preteachers at Western New Mexico University and Eastern New Mexico University. Presentations emphasized the role of special interest groups and methods of teaching about solar energy in many disciplines. These presentations reached 223 preteachers. No evaluation of these activities is planned.

Distribution of Solar Instructional Materials

The institute maintains a collection of about 150 energy curriculum books and packages. Most of these materials are in the public domain. One activity of the education project has been to select and duplicate materials for teachers. During the past fiscal year, 472 teachers contacted the institute requesting materials. Most of these contacts were through the toll-free phone and were stimulated by the newsletter. Three hundred forty-five workshop attendees were given materials, and more than 1000 teachers picked up materials at conferences. Site visits (often coupled with presentations) were used to deliver materials to an additional 228 teachers. About 2000 teachers received instructional materials during the year, most of these requested or picked up the materials voluntarily. The level of use of these materials has not been assessed.

National Energy Education Day Project

NMSEI served as the organizer of National Energy Education Day (NEED) in New Mexico. Only one school actually participated in NEED. At this school 145 students participated in science projects for an energy fair, production of videotapes, showing of films, and production of plays. Most of the activities were related to renewable technologies. Although the project established a good relationship between that school and NMSEI, it was not a success as a state-wide project.

Distribution of Photovoltaic Cells

NMSEI solicited and received 250 photovolatic cells from Solarex Corporation. A letter was sent to 125 high school department heads notifying them of the availability of the cells and accompanying instructions for using the cells in the laboratory. Teachers could request the materials through a toll-free call. Eighty-four high schools from 62 school districts requested and were sent the package (65 percent of the schools; 72 percent of the school districts). We hope to assess the impact of this distribution near the end of the current school year.

Ongoing Activities

During the current fiscal year we are continuing to publish the newsletter, distribute curriculum materials, and provide workshops at conventions. The adult education course continues to be offered with minimal involvement of NMSEI. We are also developing curriculum materials at the primary level. Although we feel we have a fairly good idea of what teachers need, we hope to refine this assessment with a survey.

Issues of Bias

Special interest groups bring to the schools materials, services, and a point-of-view. All educators who use materials and services must be aware of the provider's viewpoint and are responsible for educating students about the viewpoint. It is not enough to simply identify bias in educational materials. Students need to develop a critical approach to instructional materials so that they are capable of recognizing bias by themselves.

The NMSEI education program attempts to influence both teacher and student knowledge, attitudes, and behavior. We hope that the program will influence future consumers to be more energy conserving and to make greater use of renewable energy technologies. If teachers can help their students

understand this bias, we can work with them to form a team that provides a more complete education to their students.

Summary

Special interest groups like NMSEI usually invest most of their resources in delivering their services to schools. Evaluation of the activities of interest groups is rare and when it is done the results are usually not reported to the public. The education program of NMSEI has determined that its newsletter publication and distribution effort has been successful in increasing teaching about renewable energy. In addition, conference presentations are successful at increasing teacher knowledge. Classroom presentations and the distribution of instructional materials and equipment are popular with recipients but their influence on teaching remains unmeasured. The development of an adult education curriculum has been successful in some locations.

Future projects of the NMSEI education program need to explore the value of developing and distributing audiovisual materials. We also need to develop an inexpensive way to establish baseline data on renewable energy education in New Mexico and then to measure the impact of our services.

Notes

(1) Funding for this project is provided by the New Mexico Energy Research and Development Institute, New Mexico Energy and Minerals Department, and United States Department of Energy.

(2) See for example: Fowler, John and Janet White. 1983. Energy Education in the Schools. Washington: National Science Teachers Assn. and Glass, Lynn. 1984. Wanted: More Student Involvement Activities in Energy Education . School Science and Mathematics 84(8): 644-648.